# Education Discussion Paper

08/79: LOWER MAINLAND SCHOOL DISTRICT COMPUTER NEEDS

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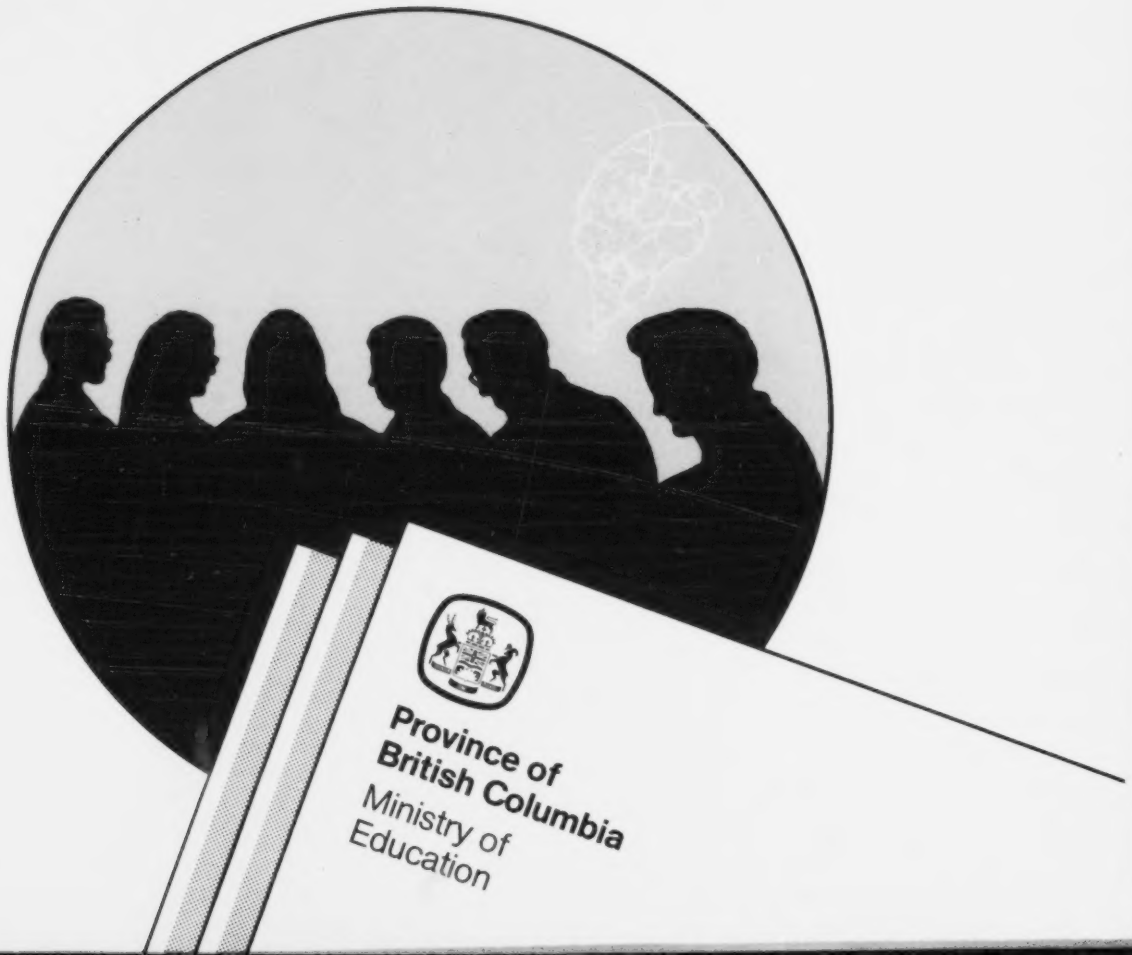

PROVINCE OF BRITISH COLUMBIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

DISCUSSION PAPER 08/79

# LOWER MAINLAND SCHOOL DISTRICT COMPUTER NEEDS

Summary Report

jem projects

Joint Educational Management Projects

Published August, 1979
Information Services

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# Lower Mainland School District Computer Needs: Summary Report

## INTRODUCTION

### Purpose of this Report:

This report summarizes the result of a joint school district/Ministry project designed to assess the business computing application requirements in six Lower Mainland School Districts. Several alternative solutions are outlined along with the final course of action.

### Background to the Study:

In the Fall of 1978, the Ministry of Education, Science and Technology was considering a project to assist school districts in the definition of systems and reports required to efficiently perform administrative functions and produce data necessary for local school district management, consistent with the Ministry's developing needs for information. At the same time, the Vancouver School Board was faced with the pressing need to replace an aging and increasingly costly computer facility. In order to address that need, the Vancouver School Board initiated a computer requirements study. Because of the similar objectives involved, the Vancouver School Board agreed to co-operate with the Ministry in an expanded study which would involve not only Vancouver, but also other interested school districts in the Lower Mainland area. Additional costs incurred through the expansion of the project were funded by the Ministry.

## Objectives of the Study:

The objectives of the study were to identify information processing requirements and analyse how these might be satisfied to the best advantage of all participating school districts. An additional objective was to ensure, if at all possible, that the systems developed and the hardware and software installed would be of such a nature as to be of potential utility to other school districts as well as being compatible with Ministry reporting requirements.

## Participants:

Lower Mainland School Districts (districts 36 to 45) were invited to participate in the project. Following preliminary discussions, an initial project meeting was held between school district and Ministry representatives on March 5, 1979. As a result of these discussions, five school districts (Burnaby, Coquitlam, Delta, New Westminster, and Surrey) agreed to participate in the study with Vancouver. West Vancouver, North Vancouver, and Richmond were not as immediately interested because of commitments already made, but agreed to keep in communication with the project. Maple Ridge had earlier indicated that it would not be participating.

## Approach to the Study:

A Project Review Committee (comprised of representatives from Vancouver, the five other Lower Mainland school districts, and the Ministry) was organized by the Ministry of Education, Science and Technology through its J.E.M. Projects group. Using information already gathered in Vancouver, the project team met with each of the participating districts

to review its information needs. The results of this data gathering activity were analysed and four alternative computer approaches which could satisfy these needs were developed. This information was presented to the Project Review Committee at a meeting on April 18, 1979. After discussion, two of the alternative approaches were identified as meriting further study. The project team then prepared development and operating costs for these two approaches. This material was reviewed with the participants at a meeting on May 4, 1979. It was agreed at this meeting that the two largest districts (Vancouver and Surrey) would continue with a request to the marketplace to determine if common computing hardware could be selected. The remaining districts were to determine their courses after this selection process was completed.

Results of Analyses:

A major part of the project was to establish the similarities among the various school districts and the Vancouver School Board and determine whether or not enough commonality existed to justify pursuing joint development efforts. Of the areas examined, the following five were found to possess the greatest degree of commonality among the school districts: Personnel/Payroll, Purchasing/Stores, Audio Visual, General Accounting, and Student Services. Details pertaining to each of the five systems are provided in Appendix A.

## ALTERNATIVES

Overview:

Four alternatives were identified and presented at the April 18, 1979 Progress Review meeting. Of the four alternatives, two involved all six

districts, and two involved only Burnaby, Coquitlam, Surrey and Delta. The alternatives involved both centralized and decentralized approaches. General hardware estimates for each alternative were presented but no specific outline was provided with respect to how facilities would be established. It was not considered worthwhile to explore the options attached to each alternative until fundamental agreement was reached on an approach.

The four alternatives considered are briefly outlined below. Specific details of the four alternatives, including schematic representation of configurations, are included in Appendix B. The four alternatives were:

1. Total centralization (all six districts in common use of one computer facility);

2. Individual compatible systems (each district acquires an appropriate model of one type of computer equipment);

3. Centralization without Vancouver (similar to option 1, but excluding Vancouver since there is the possibility that the scope of the computer systems effort required by Vancouver is not sufficiently compatible with other district needs);

4. Compatible systems without Vancouver/New Westminster (restricts hardware to districts of similar size, thereby broadening the available possibilities).

Analyzing the Alternatives:

Each of the alternatives above was presented for review at the April 18, 1979 review meeting. The objective of that meeting was to present the economics of each solution and to determine each individual district

performance.

While the centralized options appeared to present some cost benefit, consensus was reached that the modest differential did not compensate for other less tangible benefits stemming from the decentralized options. In particular, the benefits of the decentralized options included:

1. Greater control by each district over its own system;

2. Elimination of competition for resources, especially during peak times;

3. Increased security for each individual district;

4. Avoidance of the potential for domination by the larger districts;

5. Potential for larger benefits of shared development would still exist.

As a result of this meeting, the project team was instructed to explore the concepts of shared development and expand on the costs of alternatives two and four. This was to be done on the assumption that such a concept would be applied to Vancouver, Surrey, Delta, and Coquitlam. Burnaby did not believe it was ready to follow this path at this point, and New Westminster felt that it was too small to afford the hardware involved.

## SHARED DEVELOPMENT CONCEPT

### Overview:

The participant school districts were in full agreement that major segments of their business functions could be satisfied by common computer programs. This was particularly evident in student timetabling,

payroll, general accounting, and aspects of purchasing. In fact, at this time, all but Vancouver utilized the same timetabling system (and Vancouver wished to utilize that system). Vancouver and Surrey use modifications of the same payroll system, and Coquitlam and Burnaby are processed by a common payroll system. Surrey and Coquitlam has almost identical general accounting systems.

At the same time, all six districts recognize that they have unique administrative functions. Vancouver has a large stores operation. Vancouver and Burnaby have sizable centralized audio-visual departments not paralled in other districts. Surrey is concerned with the operation of a bus system. Each of these functions could require specialized computer programs.

It would be necessary for any shared development concept to provide for both types of applications.

Assumptions:

Shared development would only be possible if certain assumptions were made. These assumptions include:

1. All participating districts would have to obtain compatible computer hardware. While the size of processing power could vary to provide for differences in district size, the architecture and operating systems would have to be identical. This would mean the adoption of a common computer family and, because of size constraints, this requirement indicated at New Westminster would probably have to be excluded.

2. A mechanism to develop the common computer programs would have to be established. It was generally felt that this mechanism would have to be independent of any one district. The procedure for

allocation of costs for this mechanism would have to be established, and the need to keep the mechanism on a permanent basis for maintenance purposes would need to be addressed.

3. The applications which would be the responsibility of the central mechanism would have to be clearly specified.

4. The procedure for each district to develop unique applications in a manner which would not interfere with the control applications would have to be established. This requirement implies adherence to certain predefined standards.

Shared Development Agency:

The concept proposed was to establish a separate agency under the joint control of the participating districts. This agency would be responsible for the development of all systems defined as common, for the establishment of required systems development standards, and for the ongoing maintenance of all common systems.

The agency would have a permanent manager and staff of analysts and programmers. Depending on the number of common applications, the total permanent staff would probably be four or five individuals with others hired on a contract basis during the peak development period.

Individual districts would be responsible for the development of any unique systems. This work could be done by district staffs, by private contract, or by contract to the agency. It was generally felt that only Vancouver would be likely to have a permanent development staff.

## ASSESSMENT OF ALTERNATIVES TWO AND FOUR

### Alternative Two:

Alternative two provides sufficient computer capacity to perform both administrative functions and student timetabling. The systems envisaged were based on a high level of implementation, implying significantly more complete, more functional systems that the districts had experienced to date. In clerical areas, the systems were to be designed to minimize clerical costs by automating the greatest portions of functions possible. The details of this alternative are provided in Appendix C.

### Alternative Four:

Alternative four implies an orientation toward administration only. Since sufficient hardware would not be provided to undertake student timetabling, the alternative excluded Vancouver from consideration. The systems envisaged would be less sophisticated, more along the line of other school districts which currently have computers. This approach would not achieve the same clerical impact, but would have some benefits. These benefits included lower initial investment and more rapid development. The details of this alternative are also provided in Appendix C.

## RECOMMENDED COURSE OF ACTION

Three facts were clear as a result of the study. First, all districts share at least four common computer applications. Second, agreement on centralized hardware was not possible, but agreement on common separate hardware seemed a realistic possibility. Third, some districts were at a stage to proceed while others did not have such pressing needs or had not done sufficient preparatory work.

Based on this situation, the following recommendations were made:

1. Those districts ready to proceed (Vancouver and Surrey) would issue separate but interlinked requests to vendors for computer hardware.

2. Vancouver and Surrey would independently evaluate vendor proposals and determine the priority of selection.

3. Vancouver and Surrey would then jointly determine if compatible hardware were possible.

4. If compatible hardware were possible, details of a shared development and mechanism would be developed.

5. The other participating school districts would refrain from computer development activity until the foregoing was completed. If compatible hardware is selected by Surrey and Vancouver, each of the other districts can decide whether or not to participate in the school district development mechanism.

Since the study was completed, both Vancouver and Surrey have issued requests for hardware proposals. A copy of the letter accompanying the Vancouver request for proposal is provided in Appendix D. A similar letter accompanied the Surrey RFP.

## COMMENTS

The study provided several positive results. First, a number of school districts were provided with some initial analysis of their computing requirements and likely costs for proceeding in certain directions. Second, the districts involved have been sensitized to the possibilities of shared developments and the benefits thereof. Third, general agreement

was secured that, wherever possible, software sharing will take place. Such sharing is seen as an important step in reducing overall school district computer software development costs through obviating the necessity for each individual district to pay for the development of custom software. Fourth, the two school districts which are currently in the process of obtaining computer equipment have agreed to consider the responses to their hardware tenders in light of the need for compatibility. While there is no guarantee that the equipment will in fact be compatible, there is certainly a much greater likelihood of that eventuality than if the project had not been of a co-operative nature. Hopefully, the type of co-operation evidenced in this particular section of this project will serve as an example for future development projects. It is hoped that, through continued co-operative efforts by groups of school districts, greater savings in software development will be possible and that improved decision making through consistency of financial information reporting systems will be the net result. As a result, projects of this nature are encouraged in the expectation that they will assist school districts to develop more effective accounting and administrative procedures and improve their overall effectiveness.

# APPENDIX A

## SYSTEMS IN COMMON

## SYSTEMS IN COMMON

This section identifies and summarizes the current and potential computer requirements of the five participating school districts with respect to the defined Vancouver School Board computer needs. The purpose of the comparison is to establish the similarities between the various school districts and the Vancouver School Board and to determine whether enough commonality exists to justify pursuing a joint development effort. Costs of the data processing function are also presented. Of those areas examined, the following five are discussed here because they indicated the greatest degree of commonality.

Personnel/Payroll
Purchasing/Stores
Audio-Visual
General Accounting
Student Services

BUSINESS ADMINISTRATION

Personnel-Pay System

1. Payroll systems at all school district must cover the following six categories:

   - teachers: full and part time, paid montly ten months per year;

   - substitutes and continuing education instructors: paid monthly, ten months per year;

   - salaried staff: paid semi-monthly, twelve months a year;

   - staff on an hourly basis: regular and casual employees, paid semi-monthly, twelve months a year;

   - term staff: paid semi-monthly, ten months a year, and

   - miscellaneous staff: manual pay covering miscellaneous staff, teacher advances, salary continuance, etc., paid as required.

   While the Payroll systems are divided into various categories and are named differently, in total they cover the staff described above. Three payrolls are common to all boards; i.e., teachers, substitutes and continuing education (or night school).

2. The data stored in the Payroll files are oriented only towards the calculation of pay and are insufficient to satisfy the broader information needs of the personnel Dept. At all districts, these departments are involved

in labour relations and as a result require information for contract negotiations. All districts expressed a desire for a system which would provide more information related to employee skills.

3. All Payroll systems processed at either Datatech or the Royal Bank require significant clerical effort in the checking and preparation of data. In some cases, due to time constraints, thorough checking of input data is sacrifieced in order to meet pay day deadlines.

4. All Payroll systems require significant clerical effort in order to properly balance the payrolls, particularly in the area of benefits. Burnaby, with the largest number of staff in the Payroll Department, appear to have the tightest manual controls.

5. None of the computerized systems adequately keep track of sick leave or vacation statistics. Currently, this is being done manually, although in some cases the computer is being used to prepare reports of this information.

6. All school districts have the same problems with UIC calculations. Record of Earnings statements are produced manually because of the unreliability of computer generated figures.

7. All districts are using a combination of cheques and bank deposits as the means of payment (except for New Westminster, who pay by cheque). However, all lean towards deposits as the preferentical means of payment.

8. The systems provided by Datatech and the Royal Bank are relatively fixed. As these bureaux supply these services to many clients, they are not readily responsive to the particular needs of an individual school district.

9. Turnaround time is a problem for those districts using either Datatech or the Royal Bank services. Deadline times and dates established by the data centres must be adhered to in order to guarantee that output will be ready on time.

Purchasing - Stores

1. In all school districts, functions performed by the Purchasing Department are essentially the same. These are to:

   - evaluate requisitions from schools and district departments;
   - evaluate quotations;
   - evaluate tenders;
   - produce purchase orders; and
   - expedite or cancel overdue orders

   In most cases the Purchasing Department also ensures that the planned expenditures remain within budget, although in one case this is the responsibility of the Accounting Department. The reason for this is a practical one, i.e., budget information is more accessible to the Accounting Department than to the Purchasing Department.

2. Except for Vancouver and a portion of Coquitlam's system, all purchasing functions are manually performed.

3. In most cases, the Purchasing Department is not informed when goods are received. It is only notified when a problem arises, generally via the Accounts Payable Department. This occurs when the Accounts Payable Department receives an invoice from the supplier and has no corresponding receiving advice. The Purchasing Department performs the tracing function.

4. There is no easy way to check all orders overdue at a particular time. Due to time constraints, the Purchasing Department performs these activities on a demand basis only.

5. Preparation of catalogues is a time consuming clerical task. Deadlines to produce these are difficult to meet.

6. Centralized stores exist at some school districts, housing mainly janitorial supplies and other small items. The dollar value of the inventories in each of these stores is small; in the order of $50,000 to $60,000. Unlike the Vancouver School Board, no inventory records are maintained as it is felt that the value of the stock does not merit hiring additional staff to perform inventory related tasks.

Audio-Visual

1. All school districts, except for Surrey, have Audio-Visual Departments. These departments are, to some degree, involved in the following activities:

   - maintaining a centralized inventory of audio-visual equipment including both hardware (e.g., cameras) and software (e.g., film, records);

   - handling bookings for this material and performing associated tasks such as preparing goods for shipment and ensuring items are returned on time;

- ordering new items;

- checking and maintaining the quality of films and servicing equipment; and

- producing, audio-visual material such as overhead transparencies and illustrations.

2. Vancouver School Board is the only one with a computerized system. It is a batch system which is unresponsive to the department needs. The remaining districts are on manual systems and can realize a turnover of goods twice a week.

3. A problem exists in producing catalogues to send to the individual schools. Ideally, this should be done annually. However, due to time limitations, this is not always possible.

4. No data exists to enable the department to determine which items are heavily used and which experience little or no turnover.

5. Booking of film, equipment, records, etc. is a time consuming clerical task.

6. It is difficult to determine which items are overdue.

General Accounting

1. Four of the five districts are using a computer facility to do a portion of their General Accounting functions. Surrey, Coquitlam and Delta are currently processing both Accounts Payables and the General Ledger at Datatech. For these three, the activities are the most similar. All three process semi-monthly. Both New Westminster and Burnaby have manual systems and only produce Payables cheques monthly.

2. The computerized Accounts Payable Systems serve primarily as cheque writing systems. They remain labour intensive systems as the tasks related to filing and matching of purchase orders, receiving advices and invoices continue to be clerical functions. Additionally, the clerks must continue to check for invoice accuracy.

3. Turnaround time for some districts is a problem.

4. The Chart of Accounts employed by each board is based on the Government Standard broken down as follows:

   A = Administration Accounts
   B = Instruction Accounts
   C = Operation Accounts
   D = Repairs and Maintenance
   E = Conveyance of Pupils
   F = Auxiliary Services

   While the general categories are the same on the summary level, the numbering systems are inconsistent across the districts at a detail level.

5. The Accounting system focuses on the central district operation. Some items are budgeted and controlled at a school level, however, these are minimal. Most districts expressed the desire to obtain that level of control if possible.

6. The system does not tend to aid the schools in controlling flexible funds.

7. In recent years, individual schools have had significant monies in their private funds. Both the school districts and outside auditors would like to have more control as to how this money is being used.

8. As with the Payroll systems, the General Accounting systems are relatively unresponsive to changes required by the individual school boards.

STUDENT SERVICES - SECONDARY SCHOOLS

1. All five school districts are using either the timetabling and/or grade reporting services provided by Columbia Computing. Additionally, Burnaby is performing some attendance reporting at Burnaby Municipal Hall. Vancouver School Board is doing these tasks primarily in-house.

2. The costs of the Columbia services include data entry, processing and report preparation. The charges allow for one to three timetabling simulation runs per school.

3. Timetabling is performed twice a year. Grade reporting is performed three or four times per year.

4. All boards using Columbia's services appear satisfied. Only one board expressed concern over turnaround time for the September timetabling activities. It is felt that the deadline date imposed by Columbia in 1979 will not give the teachers sufficient time to produce the best possible schedules.

# APPENDIX B

## ALTERNATIVE CONFIGURATIONS

## ALTERNATIVE CONFIGURATIONS

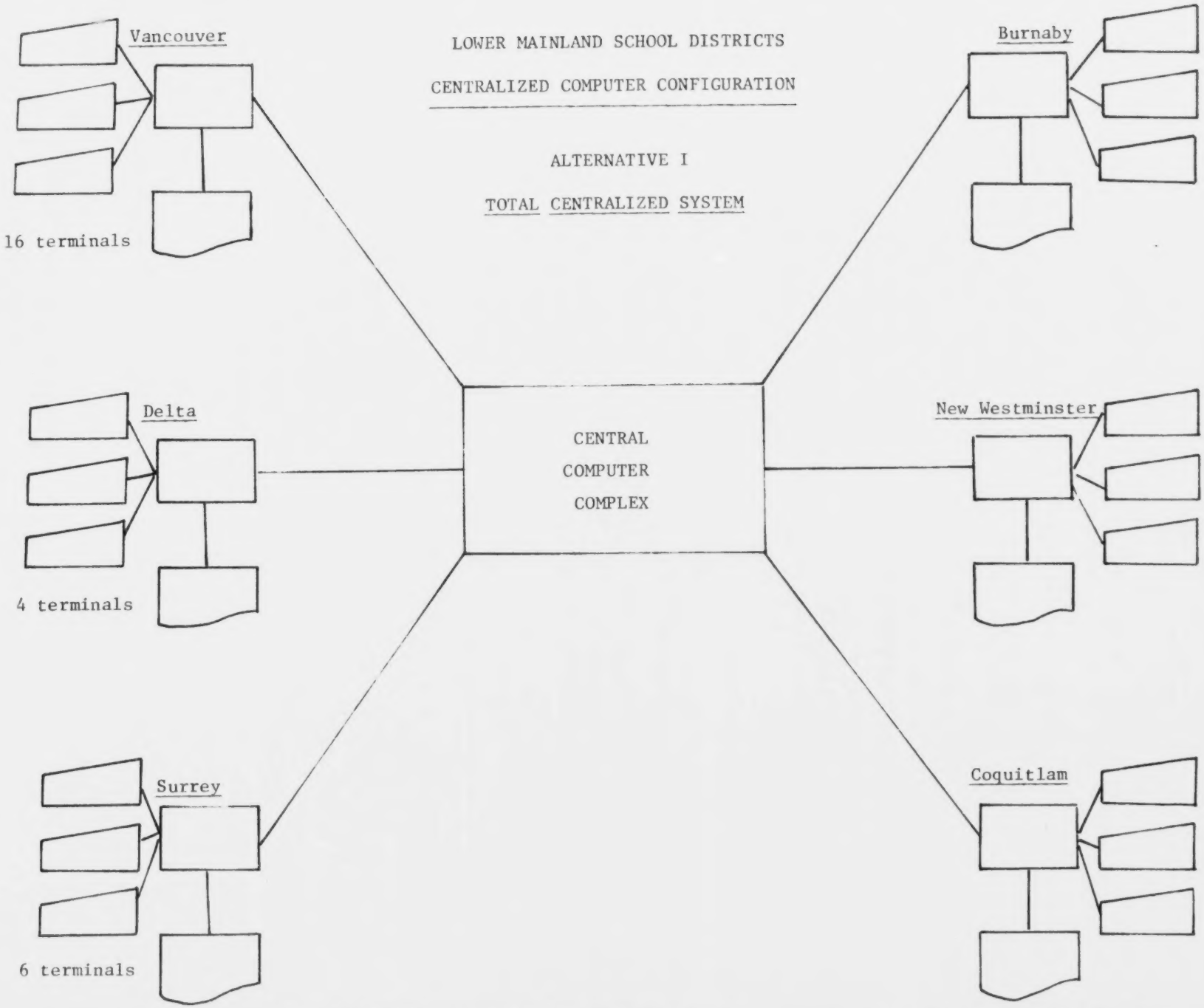
The intent of this section is to briefly summarize the collective computing alternatives which exist for the six school districts involved in the study. This list is not exhaustive as there are, no doubt, dozens of variations which could be explored. Those discussed below represent only basic variations relevant to this study. These were put forth to stimulate discussion at the April 18, 1979 progress review meeting.

Four alternatives are considered, two involving all six districts and two which would exclude Vancouver and New Westminster. These alternatives involve both centralized and decentralized approaches. General hardware costs for each alternative are presented. In each case, we have not outlined specifically how the facilities would be provided. Each alternative could have many options. It was not worthwhile to explore all of these options until fundamental agreement on an approach was reached.

### TOTAL CENTRALIZATION

This alternative would involve all six districts in the common use of one computing facility. This facility would be organized in a manner to provide each district with their own data input and printing capabilities. This would be done using a variety of remote terminal devices. Each application would be operated independently by each district as if the computer were located on their premises. Sufficient computer resources would be provided to minimize processor conflicts among the districts. The type of facility envisaged is indicated schematically on page 20.

Costs of operating the facility would probably be shared on a predetermined percentage basis. This is essential since the total costs must be fully recovered. The method of determining the percentages would be a matter of negotiation. The


LOWER MAINLAND SCHOOL DISTRICTS
CENTRALIZED COMPUTER CONFIGURATION
ALTERNATIVE I
TOTAL CENTRALIZED SYSTEM
Vancouver
16 terminals
Burnaby
Delta
4 terminals
CENTRAL
COMPUTER
COMPLEX
New Westminster
Surrey
6 terminals
Coquitlam

actual computing facility itself could be run by one district on behalf of the others, jointly operated under a collective management or provided by an outside agency, either private or public.

Programs provided by the facility could be developed in two ways. In areas involving common systems requirements, joint development could take place. The cost of this development would be shared on an agreed upon basis. In areas involving unique systems requirements, each district would be able to supply its own programs.

The advantages of this approach include:

Each district would have access to a much larger and more powerful computer facility than it could afford on its own.

The overhead of staff and systems software would be shared. By centralizing the combined data processing staffs, better personnel backup and support would be available.

The joint computer applications could be developed in a more thorough and complete way because of the greater financial resources involved. This implies better application systems which are more likely to reduce clerical effort in user departments.

INDIVIDUAL COMPATIBLE SYSTEMS

This alternative would require each district to acquire an appropriate model of one type of computer equipment. Depending on size, districts would acquire more hardware as necessary. All hardware would be compatible and operate the same programs. Each district would pay the full costs of its own hardware and any staff costs it incurred.

As a group, all districts would pool development resources to provide for common systems. These systems would be developed in one location (perhaps different locations for different systems). A copy of each system would be made available to each district.

The advantages of this approach include:

1. Independence in the use of hardware.

2. Shared development of those systems deemed to be common.

3. The costs of hardware would be fixed.

## CENTRALIZATION WITHOUT VANCOUVER

This approach is similar to the first alternative, except that Vancouver would not be involved. The reason for this alternative is the possibility that the scope of computer systems effort required by Vancouver is not sufficiently compatible with other district needs. In this eventuality, there is no reason the other districts should not undertake a consolidated facility. The advantages of this approach would be similar to the first except that costs may be higher in the development areas. A schematic of this approach is presented on page 23.

## COMPATIBLE SYSTEMS WITHOUT VANCOUVER/NEW WESTMINSTER

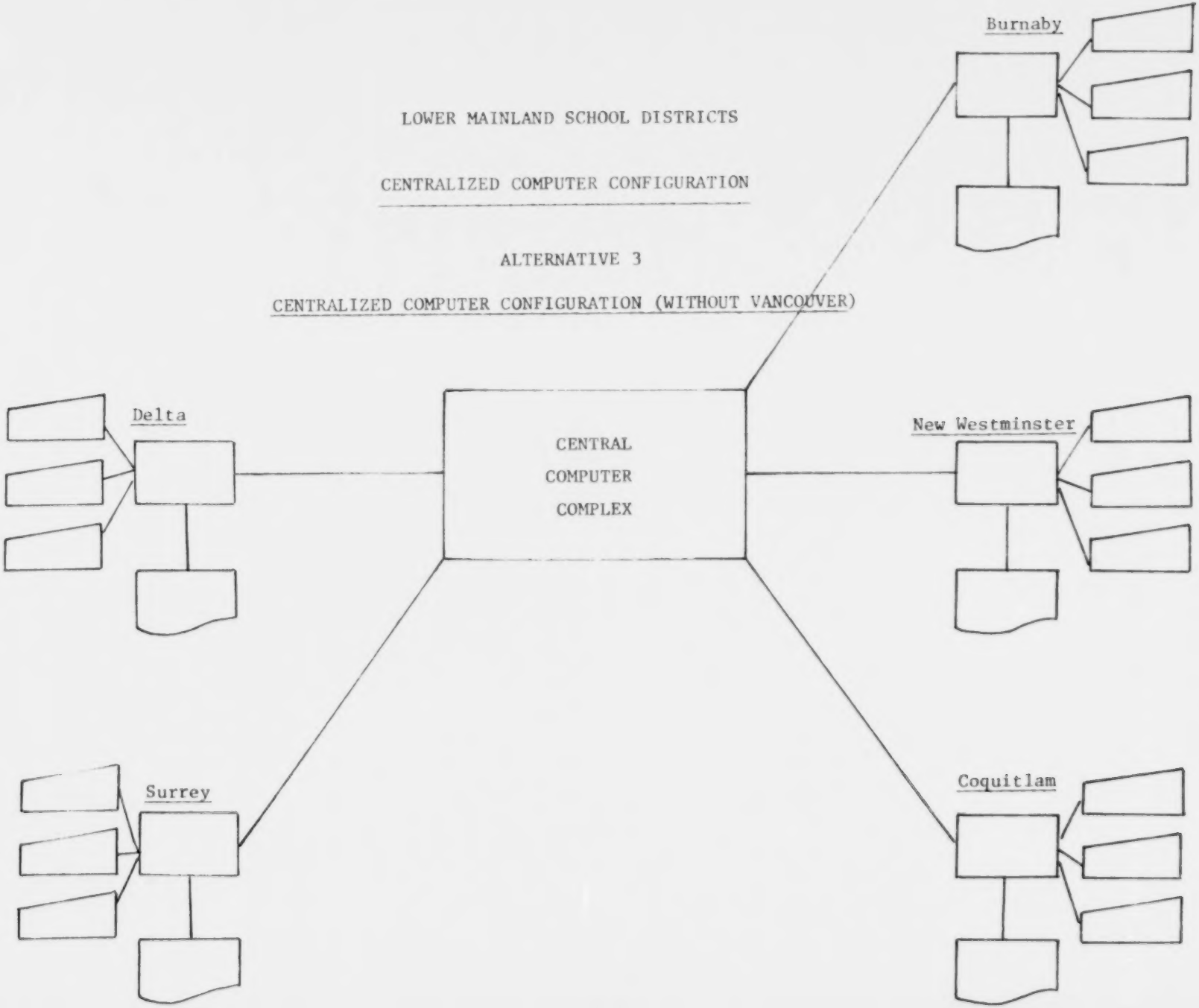
This is a variation of the second approach. It would envisage the four districts acquiring compatible hardware. Other factors would remain the same.

LOWER MAINLAND SCHOOL DISTRICTS

CENTRALIZED COMPUTER CONFIGURATION

ALTERNATIVE 3

CENTRALIZED COMPUTER CONFIGURATION (WITHOUT VANCOUVER)



The prime purpose for this alternative is to broaden the selection of hardware available. This occurs because the four districts are similar in size. A number of hardware options that lack the range required in the second alternative would be available. It would be reasonable to assume that this would reduce hardware cost. On the other hand, development costs are likely to be higher.

## ANALYZING THE ALTERNATIVES

Each of the alternatives above was presented for review at the April 18, 1979 school district meeting. The objective of that meeting was to present the economics of each solution and determine each individual district performance.

While the centralized options appeared to present some cost benefits, consensus was reached that the modest differential did not compensate for the less tangible benefits stemming from the decentralized options. In particular, the benefits of the decentralized options included:

1. Greater control by each district over their own system.

2. Elimination of contention for resources, especially during peak times.

3. Increased security to each individual district.

4. Avoidance of the potential for domination by the larger districts.

5. Potential for the larger benefits of shared development would still exist.

As a result of this meeting, the project team was instructed to explore the concepts of shared development and expand on the costs of Alternatives 2 and 4. This was to be done on the assumption that such a concept would be applied to Vancouver, Surrey, Delta and Coquitlam. Burnaby did not believe it was ready to follow this path at this point. New Westminster was felt to be too small to afford the hardware involved (except perhaps on a shared basis with Coquitlam).

# APPENDIX C

## DETAILS OF ALTERNATIVES TWO AND FOUR

## DETAILS OF ALTERNATIVES TWO AND FOUR

### ALTERNATIVE TWO

Alternative Two was defined as the 'like' Vancouver approach. This meant it combined sufficient computer capacity to perform both administrative functions and student timetabling. The systems envisaged were based on a high level implementation, implying significantly more complete, more functional systems than the districts had experienced to date. In clerical areas, the systems were to be designed to minimize clerical cost by automating the greatest portion of functions possible.

The analysis made it clear that the smaller districts would have to acquire somewhat more hardware than they actually needed, simply to remain compatible with Vancouver. The ongoing costs would be similar to present data processing costs. The most important benefit of sharing was apparent in a consideration of development costs. The total common system costs would approach $500,000. This amount would be less than half the cost were each district to attempt to develop similar systems on their own.

### ALTERNATIVE FOUR

Alternative Four was defined as the 'without' Vancouver approach. This approach implied an orientation toward administration only. Sufficient hardware is not provided to undertake student timetabling. The systems envisaged would be less sophisticated, more along the lines of other school districts which currently have computers. This approach would not achieve the same clerical impact but does have some benefits. These benefits include lower initial investment and more rapid development.

The ongoing operational costs in this alternative for Coquitlam and Delta were substantially higher than their present administrative data processing costs.

# APPENDIX D

## LETTER ACCOMPANYING VANCOUVER REQUEST FOR PROPOSAL

COMPUTECH CONSULTING CANADA LTD.

May 23, 1979

Vendor List
(As attached)

Dear:

We have enclosed the specifications of a Request for Proposal for the Vancouver School Board. This document outlines both hardware and application software requirements of the Board. In your response, we would ask that you follow the format indicated in Section 6.

Once you have had an opportunity to review the enclosed material, we would be pleased to meet with you to answer questions you might have. We will also arrange meetings with specific school board officials particularly in regard to application requirements, should you believe this to be necessary.

This request is issued in parallel with a similar activity undertaken by the Surrey School Board. These boards have had recent discussions about the possibilility of combined development activities on the basis that each had a compatible type of computer equipment. While vendor proposals will be initially evaluated separately, joint discussions will be held before a final decision is reached. The result of these discussions may influence the equipment decision. You should be aware of this possibility during the preparation of your proposal.

Yours very truly,

G.R. Gisel
President

GRG:lm
Encl.



1009 - 1177 WEST HASTINGS STREET, VANCOUVER, B.C. V6E 2K3 TELEPHONE 688-1371